DOCUMENT RESUME

ED 476 970 IR 021 698

AUTHOR	Bate, Frank; Oliver, Ron
TITLE	Beyond W3C: TruVision--Enhanced Online Learning for People Blind or Vision Impaired.
PUB DATE	2002-06-00
NOTE	7p.; In: ED-MEDIA 2002 World Conference on Educational Multimedia, Hypermedia & Telecommunications. Proceedings (14th, Denver, Colorado, June 24-29, 2002); see IR 021 687.
AVAILABLE FROM	Association for the Advancement of Computing in Education (AACE), P.O. Box 3728, Norfolk, VA 23514. Tel: 757-623-7588; e-mail: info@aace.org; Web site: http://www.aace.org/DL/.
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	*Assistive Technology; Computer Assisted Instruction; *Computer System Design; Distance Education; Educational Technology; Foreign Countries; Information Processing; Instructional Materials; *Online Systems; *Special Needs Students; *Visual Impairments; *Vocational Education
IDENTIFIERS	Australia

ABSTRACT

This paper describes the design and development of TruVision, an online learning environment designed to enable blind and vision impaired students to develop skills and expertise in elementary and advanced information processing strategies to enable them to seek full-time employment within industry in such positions as administrative assistants, Help Desk personnel and data entry operators. Truvision is a product within The Flexible Learning Toolboxes Project, a component of the Australian Flexible Learning Framework for the National Vocational Education and Training System 2000-2004 (AFL Framework). The AFL Framework is designed to support the accelerated take-up of flexible learning modes and position Australian VET as a world leader in applying new technologies to vocational education products and services. This paper describes the TruVision product and showcases its innovative design based on very stringent accessibility needs and guidelines. (Author)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 476 970

Beyond W3C: TruVision - Enhanced Online Learning for People Blind Or Vision Impaired

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

G.H. Marks

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

Frank Bate
E-learn
frank.bate@elearn.wa.edu.au

Ron Oliver
Edith Cowan University
Western Australia
r.oliver@ecu.edu.au

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Abstract: This paper describes the design and development of TruVision, an online learning environment designed to enable blind and vision impaired students to develop skills and expertise in elementary and advanced information processing strategies to enable them tom seek full-time employment within industry in such positions as administrative assistants, Help Desk personnel and data entry operators. Truvision is a product within The Flexible Learning Toolboxes Project, a component of the Australian Flexible Learning Framework for the National Vocational Education and Training System 2000-2004 (AFL Framework). The AFL Framework is designed to support the accelerated take-up of flexible learning modes and position Australian VET as a world leader in applying new technologies to vocational education products and services. This paper describes the TruVision product and showcases its innovative design based on very stringent accessibility needs and guidelines.

Introduction

Online learning environments in higher education are frequently criticised for their failure to make the most of the opportunities afforded by the new technologies (eg. Dehoney & Reeves, 1999). Too often the design of the settings is constrained by such practical factors as inflexible delivery systems, the need for converged on and off-campus settings, and the quest to generate on-line courses from existing print-based materials. Rarely do developers have the opportunity, the direction and the support to plan and build high quality online learning materials. One project in Australia, however, that differs from others in this regard, is the Flexible Learning Toolboxes Project (ANTA, 2001).

The Toolbox initiative is part of the Australian Flexible Learning Framework for the National Vocational Education and Training System 2000-2004 (AFL Framework). The AFL Framework is designed to support the accelerated take-up of flexible learning modes and position Australian VET as a world leader in applying new technologies to vocational education products and services (EdNA VET Advisory Group, 2000). A Toolbox is a collection of resources, suggested learning strategies and supporting material for the online delivery of vocational education and training. The learning resources are Web-based and designed in a manner which facilitates customisation and reuse in the National Training Framework, the basis of qualifications and accreditation in the Australian VET sector.

Flexible Learning in the VET sector

National and state authorities responsible for VET within Australia have recognized for some years that developing online materials is expensive and best achieved through a collaborative approach. It was this challenge that prompted the Australian National Training Authority (ANTA) to consider strategies that could motivate and support registered training organisations (RTOs) to embrace modes of flexible delivery for their

IR021698

BEST COPY AVAILABLE

students. A resource strategy was formulated by which sets of generic and customisable materials could be developed and applied widely throughout the training sector. The intention was to create efficiency and economies of scale though large scale production of learning materials capable of wide acceptance and use. This plan became the ANTA Flexible Toolbox Project which has evolved since 1999 into the Flexible Learning Toolbox Project of today. The Toolbox initiative was a strategy to encourage development and delivery of more flexible learning materials for the training market – particularly for online learning.

Flexible Learning Toolboxes

The phrase "Training Package" has a specialised meaning in the Australian VET sector, referring to a nationally endorsed statement incorporating the competency standards, assessment guidelines and qualifications relating to training in a particular industry sector. These components are uniform at a national level but allow for a range of flexible training pathways for achievement and assessment.

The introduction of Training Packages within the National Framework in 1998 provided a perfect opportunity for the Australian National Training Authority to explore the concept of Flexible Toolboxes to support learning. In the first instance, any products developed in this setting would have widespread application providing significant economies of scale. Secondly the use of on-line technologies appeared to provide and promote the many forms of flexibility associated with the delivery of the Training Packages in the national setting.

The Flexible Learning Toolbox Project has carried three main development stages to date, from Series One in 1999 to the recently completed Series Three. Developers bid for funding to build Toolboxes from funding managed by the Flexible Learning Advisory Group (FLAG), a committee with strong interest and expertise in flexible delivery in the VET sector. Teams and consortia work together to develop bids to build online learning resources for qualifications within the national Training Packages. Teams are required to demonstrate strong links with the industry groups and to propose online materials that demonstrate evidence of sound contemporary learning designs and development processes that create materials with high levels of product utility. The following descriptions from the developers' guidelines highlight these aspects of Toolbox design:

a. Toolbox learning designs

A fundamental requirement of Toolbox resources is the need to exhibit effective teaching and learning approaches. To support this requirement, proponents need to demonstrate their capacity to develop resources with the following features:

- *a firm basis in an educational model which recognises an active, constructive role for learners;*
- *learning activities which engage the learner in active processing of the subject matter rather than mere knowledge acquisition;*
- *learning settings and tasks that encourage meaningful online communication and interaction (between learners as well as between teachers and learners);*
- *content resources which are visually attractive, motivating to use and organised logically for ease of navigation; and*
- *representations of authentic and real life settings in preference to textual descriptions.*

b. Toolbox product utility

A second important consideration concerns product utility characteristics. Toolboxes are expected to allow for wide applicability across the target audience for whom they are intended. For this reason they are expected to be flexible, portable to a range of delivery platforms, and readily customised. Desirable characteristics include:

- *the use of readily available non-proprietary development software;*
- *the use of HTML code where customisation can be anticipated, with more sophisticated development software (eg Flash) reserved for components that are unlikely to be changed;*
- *the development of platform independent resources which allow for maximum portability to users' delivery platforms;*
- *avoidance of rigid structuring devices locking the learner into one pathway through the material (although a suggested learning sequence may be desirable); and*
- *a file and directory structure that facilitates the location of a particular learning segment, or the selection of a single unit as well as the use of the whole Toolbox.*

BEST COPY AVAILABLE

Toolboxes are also expected to be widely accessible. They are expected to operate on client computers running at 300 MHz and guidelines are provided to developers for aligning the Toolboxes with:

- *the EdNA metadata standards;*
- *the W3C content accessibility guidelines (Priority 1); and*
- *the Preferred Standards Project.*

TruVision

TruVision (http://www.elearn.wa.edu.au/truvision) is one of six ANTA Equity and Access Online Product Development projects commissioned in 2001. It is an online learning environment that has been designed to offer on- and off-line options in the vocational education sector for learners who are blind or vision impaired. Through the establishment of a simulated Help Desk entity, TruVision provides a variety of authentic, work-based online learning experiences that prepare learners for vocational outcomes in the IT industry. IT Help Desk occupations are particularly attractive to people with a visual disability.

The framework that was used to inform and guide the instructional design process is a component model, described in Table 1, which comprises three elements which represent critical components of any learning settings. In particular, the framework highlights connections and distinctions between the elements which can be made in the design of online learning settings (Oliver, 1999).

Table 1: Framework describing critical elements of online learning settings

learning design elements	description	examples
learning activities	The tasks, problems, interactions used to engage the learners and upon which learning is based	Reading activities, computer-based interactions, simulations, inquiry tasks, projects, open-ended problems, inquiry tasks, collaborative tasks
learning resources	The content, information and resources with which the learners interact in completing the tasks	Web pages, readers, textbooks, computer-based tools, Web links, notes, documents, workplace manuals, case studies, databases
learning supports	The scaffolds, structures, motivations, assistances and connections used to support learning	Learning guides, discussions, chats, suggested learning pathways, mentors, buddies, workplace trainers

The framework provides a means to isolate and study the various elements within learning settings and suggests emphases which can be made in the instructional design process. Contemporary learning theories posit that the forms of learning design most appropriate to higher education are those based on constructivist learning principles. The above framework takes on particular and discrete forms when applied this way.

In the context of the instructional design for the TruVision setting, authentic tasks were used as the organising framework for the learning process. Students are provided with realistic and relevant tasks which they are required to complete. In order to assist them in completing the tasks, a range of learning resources and scaffolds for learning are provided. The learning setting is comprised of these carefully chosen learning tasks and learning supports to scaffold learners as they undertake them. The content in the setting takes the form of a variety of learning resources which are organised within the virtual office setting in much the same way as the learners will find resources in the workplace.

Design Considerations

With most online settings, the instructional design precedes any decisions about interface design. In this product, it was essential to marry the two so that the learning setting would provide the accessibility required. The design of TruVision needed to go beyond compliance to W3C standards alone. In its final form, it provides an audio and text-based interface for people that are totally blind so that they can hear the learning context and interactions through a combination of screen reader and streamed audio. In addition, TruVision interprets this audio and text-based interface with a graphical version for people with vision. In this way, two versions of the

learning environment are provided on each and every web page, both of which are invisible to the other. The concept is represented as Figure 1.

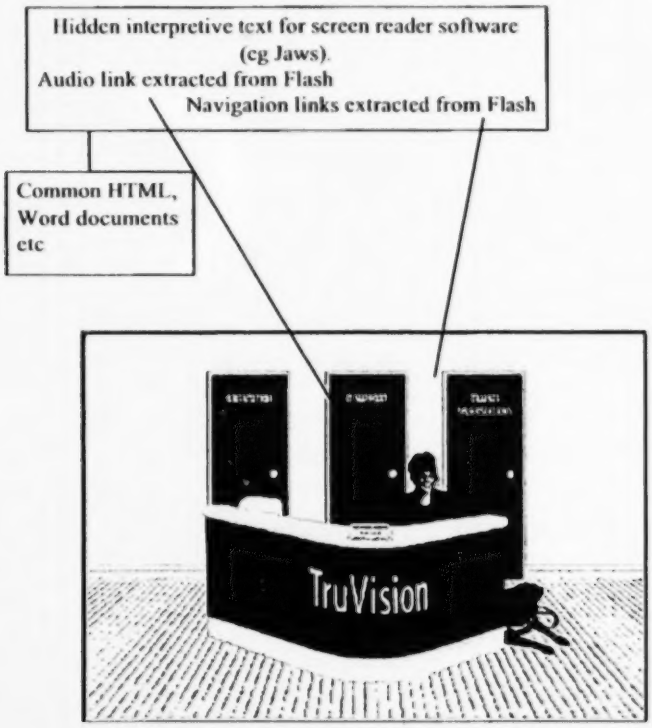


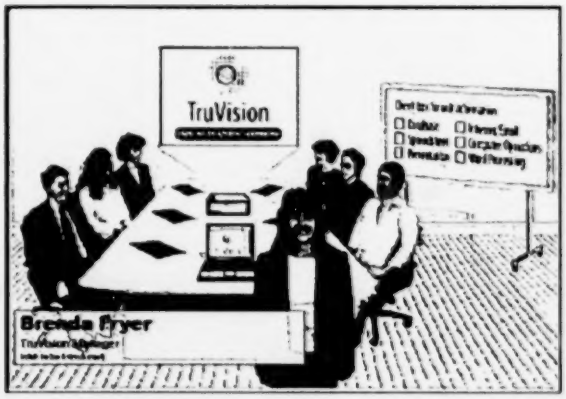
Figure 1: The TruVision Design Model

The TruVision Setting

The task of designing for the range of vision impairment and adaptive technologies was complex. The following sections of the paper explain the design considerations underpinning TruVision, and demonstrate how educational design decisions were taken.

Figure 2: Authentic learning tasks

TruVision is a learning environment based around authentic tasks. The learners find themselves immersed in a virtual workplace and undertake tasks and activities which accurately reflect how they will need to apply their learning in the workplace. Assessment, activities and resources are closely aligned with the learning outcomes that are sought.



BEST COPY AVAILABLE

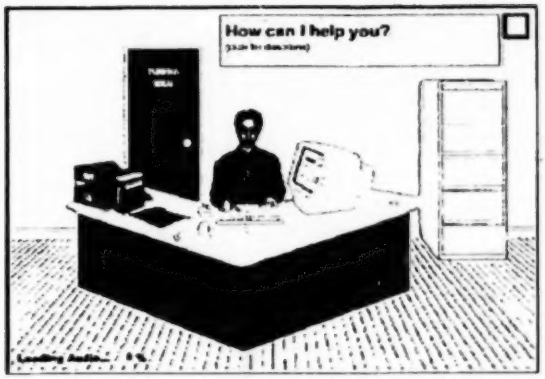


Figure 3: Rich media usage
In order to provide accessible materials for blind and vision impaired learners, the setting makes extensive use of audio and visual materials to cater for the range of people that are vision impaired. The learners use the site with the same tools and processes that vision impaired people currently use in workplace settings.

Figure 4: Customisation and Reuse
The learning setting has been designed and built for customisation and reuse. There are many elements within to support this application including a comprehensive Teachers' Guide to assist others to implement TruVision. The Teachers' Guide provides a range of suggestions and strategies to help facilitators balance content and collaborative dimensions of online learning.

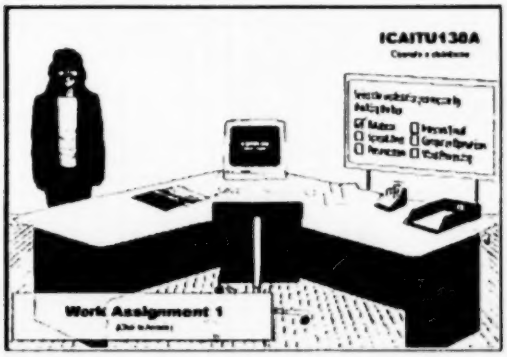
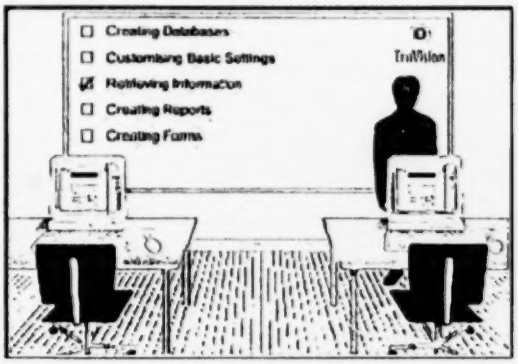


Figure 5: Assessment
The learning setting includes a range of assessment activities to support independent and classroom learning usage. The assessment tasks include a range of formative and summative strategies as both supports and scaffolds for learning. The assessment tasks also provide strong measures of competence and achievement of course aims through the authentic tasks on which they are based.

Figure 6: Flexible use
TruVision has been designed in ways which will support a variety of instructional applications and able to support learners with a range of learning styles. The flexible nature of the setting with a separation of learning tasks, learning resources and learning supports makes it a tool that can be adapted to suit the needs of a broad range of learners and their preferred learning styles.



BEST COPY AVAILABLE

User-Testing

The development of TruVision was accompanied by a rigorous and comprehensive program of usability testing to ensure the product was able to meet the needs of the diverse target audience (eg. Nielsen, 1993). A comprehensive user-testing program was undertaken as part of the design process and feedback was gathered from learners in a variety of contexts. These include learners using screen readers, screen magnification software and with learners who were using no adaptive technologies at all. This program was undertaken in collaboration with:

-The Association for the Blind of WA (Inc)
-The Royal Blind Society (NSW)
-The Royal Victorian Institute of the Blind

Coupled with the usability testing was a series of formative assessments to explore the success of the learning environment among learners who were unaccustomed to online and computer-based environments. More comprehensive testing and evaluation of the learning setting is being planned to enable its capability to serve the diverse audience to be more fully explored. This testing will also explore strategies which will enable the learners to undertake collaborative and communicative tasks and to enjoy the enhanced learning opportunities that these strategies afford sighted learners.

Conclusion

The TruVision project is going a long way to be meeting the expectations of the stakeholders in terms of innovative and accessible design. Initial feedback from learners and teachers suggests that it is a successful learning setting for the target audience and that it provides a valuable template for sound educational practice coupled with accessibility for other online product development to follow.

References

ANTA (1998) *A bridge to the future: Australia's National Strategy for Vocational Education and Training 1998-2000*,. Australian National Training Authority, Brisbane.

ANTA, (2001). *Australian Flexible Learning Framework for the National Vocational Education and Training System 2000-2004*. Brisbane, Queensland. Australian National Training Authority.

Australian Flexible Learning Framework (2001). http://www.flexiblelearning.net.au [accessed: Dec 2001]

Dehoney, J., & Reeves, T. (1999). Instructional and social dimensions of class web pages. *Journal of Computing in Higher Education, 10*(2), 19-41.

Eccles. C., (1998) *A New Training Culture for Australia: The Right Stuff*, Australian National Training Authority, Brisbane.

Nielsen, J. (1993). *Usability Engineering*. Boston: Academic Press.

Oliver, R. (2001). Seeking best practice in online learning: Flexible Learning Toolboxes in the Australian VET sector. *Australian Journal Of Educational Technology, 17*(2), 204-222.

TruVision (2002). http://www.elearn.wa.edu.au/truvision

BEST COPY AVAILABLE

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

Reproduction Basis

[X] This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

[ ] This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").